

**Claims**

1. A network element for use in an optical communication network, in particular a DWDM communication network, the network element comprising:

- a plurality of receivers for receiving optical communication signals,
- a plurality of transmitters for transmitting optical communication signals, and
- a plurality of network connections, each network connection having an individual signal impairment characteristic,

wherein the pluralities of receivers and transmitters employ a plurality of different modulation schemes, and

wherein the pluralities of receivers and transmitters are assigned to the network connections as a function of the individual signal impairment characteristics.

2. The network element of claim 1, further comprising a multiplexer adapted to multiplex optical communication signals from the plurality of transmitters employing different modulation schemes onto a single optical output fiber.

3. The network element of claim 1, further comprising a demultiplexer adapted to demultiplex optical communication

signals from a single optical input fiber to the plurality of receivers employing different modulation schemes.

4. The network element of claim 1, further comprising a lightpath provisioning unit configured to select one from the plurality of transmitters for a signal to be transmitted as a function of an impairment parameter corresponding to a desired network connection.
5. The network element of claim 4, wherein the impairment parameter is a distance from the network element to a target node.
6. The network element of claim 1, wherein the plurality of modulation schemes comprises direct modulation and external modulation of the optical communication signals to be transmitted.
7. The network element of claim 1, wherein the plurality of modulation schemes comprises a plurality of different carrier wavelengths for modulation.
8. The network element of claim 1, wherein the plurality of modulation schemes comprises a plurality of different bit rates.
9. An optical communication network comprising a plurality of nodes connected by a plurality of network connections, wherein at least some of the nodes comprise a network element as defined in any of claims 1 to 8.

10. A use of a network element as defined in any of claims 1 to 8 for upgrading an optical communication network in terms of distances allowed between network elements.
11. A method of communicating messages within an optical communication network, in particular a DWDM communication network, the method comprising the steps of:
- providing a message which is to be transmitted from a source network element to a destination network element,
  - modulating an optical carrier signal with the message in the source network element, and
  - transmitting the modulated carrier signal across a network connection to the destination network element,

wherein the step of modulating comprises a first sub-step of determining an individual signal impairment characteristic of the network connection, and a second sub-step of selecting a modulation scheme from a plurality of different modulation schemes as a function of the individual signal impairment characteristic determined.